

Results of EWA Gaming

Presented at the Quinn/Spear
meeting
May 12, 1999



Game 2- \$30M/yr -\$150M

Location	TAF	Options	\$
NOD	\$45/500	\$5M	50
SOD	\$45/500	\$5M	50
Spot	100		20
GW pumping	120 out 240 in		30



Game 4- \$40M/yr -\$120M

Location	TAF	Options	10-year lease
NOD	\$27/110	\$15M	\$45/150
SOD	\$27/230		
Spot	100		13
GW	0		
pumping			



GAMES COMPLETED

- Game 1 - Middle Stage 1 Assets -- Type 1
- Game 2 - Late Stage 1 Assets -- Type 1
- Game 3 - Late Stage 1 Assets -- Type 2
- Game 4 - Early Stage 1 Assets--Type 1

Type 1 - Gallon for Gallon
Type 2 - Credit Approach

Baseline of Accord + upstream and Delta AFRP



GAMES PLANNED

- Game 5 - Early Stage 1 Assets - w/o InDelta AFRP - Type 1
- Game 6 - Late Stage 1 Assets - w/o InDelta AFRP - Type 1



Early Stage 1 Assets Game 4

- South Delta Program - 8,500 cfs, Temporary barriers in.
- JPOD
- E/I, In-Delta AFRP Variances
- Ground Water (400 TAF; 40 TAF/Mo. in-out)
- Shasta Enlargement (50 TAF)
- Water Purchase (NOD, SOD, spot market) -- \$40m/yr.
- San Luis Storage Borrowing
- Unused System Capacities
- Demand Shifting (100 TAF/yr)



Late Stage 1 Assets

Game 2

- Expanded Banks - 10,300 cfs
- JPOD
- E/I, In-Delta AFRP Variances
- Ground Water (600 TAF; 60 TAF/Mo. in-out)
- Shasta Enlargement (50 TAF)
- Webb Tract Storage (120 TAF, 2,000 cfs. in-out)
- Bacon+ Storage/Connected (200 TAF, 4,000 cfs in; 2,000 cfs. out)
- ET Reductions on Delta Islands (60TAF / year)
- Water Purchase (NOD, SOD, spot market) -- \$30m/yr.
- San Luis Storage Borrowing
- Unused System Capacities
- Demand Shifting (100 TAF/yr)



EWA benefits to Delta

Smelt

- 100 TAF of purchase water from San Joaquin tributaries each year for release in spring to reduce entrainment and enhance X2
- Export reductions immediately before and after VAMP further reduce entrainment losses of larval and juvenile smelt and enhances X2
- DEC-MAR export reductions reduce salvage losses adult smelt



Fish Results

- EWA provides flexibility.
 - Reduced exports and increased flows are good
 - Increased exports are problematic at times.
- VAMP export reduction decreases entrainment in April/May in baseline and EWA game.
- Easier to protect fish in dry years than wet years.
- Focused mostly on listed species , others also affected.



EWA benefits to Salmon

- 100 TAF purchase water from San Joaquin tributaries each year for release in spring to enhance migration to and through Delta. Also benefits Sacramento salmon.
- Exports reductions immediately before and after VAMP further reduces losses of salmon.
- DEC/JAN export reductions reduce salvage losses and support migrations of spring run, late fall run, and winter run salmon smolts through the Delta
- FEB/MAR export export reductions reduce salvage losses of winter run smolts and fall run fry.



EWA Conclusions for fish

- Delta Smelt: Prescriptive standards with supplemental EWA added more protection than EWA in most cases.
- Splittail: EWA added protection in all games.
- Salmon: Most benefits for salmon and steelhead came from upstream actions of the EWA.



Water Quality Conclusions

- Parameters: Bromide, Chloride, TDS, Organic Carbon
- Objectives/indices:
 - Measured as progress towards WQ goals
 - Stage 1 WQ targets are already met in some periods
- Salinity assessment
 - Initial use of asset in game (\$10M/YR), Increased outflow in fall
 - Tradeoff: reduce worst salinity spikes by about 50mg/l (Cl), 100mg/l (TDS) for 2-3 months
 - Issues: Efficient? Quality-supply tradeoff in repeating critical years, competition for transfers?



Water Quality Conclusions (Con't)

- Organic carbon at South Delta intakes:
 - Avoid seasonal peak: time drainage and/or adjust export operations
 - Export shift (in time) related to EWA operation: reduce DOC (about -5%)
 - Increase due to in-Delta storage: estimates depend on assumptions (about +5%)
 - Current analysis crude: CALFED could link with more thorough CUWA/DW/ USBR study



Water Quality Conclusions (Con't)

- Tradeoffs:
 - Shifting pumping from Feb-Mar to summer and fall will improve DOC of exports
 - In drier years this operation could increase export salinity.
 - In wetter years this operation may actually improve salinity



Essential EWA Assets

- A monetary account for water purchases
 - \$40M to \$50M at start of Stage 1 - \$20M to \$30M at end of Stage 1
- Ability to purchase and transfer water at a reasonable cost and at needed times
 - Up to 100 TAF Sacramento River System
 - Up to 150 TAF San Joaquin River System
 - Up to 250 TAF in Export Areas
- Ability to Vary Standards
- Adequately screened project water diversion intakes in south Delta
- JPOD with no State and federal sublimits



Essential EWA Assets (con't)

- Access to storage upstream and south of Delta and Delta Islands
 - Utilize available storage in existing reservoirs; **San Luis is key** with other SWP and CVP storage.
 - Late in Stage 1 need storage closer to export pumps for flexibility. Wedd Tract and Bacon/others Islands with a direct connection to bacon and CCF
- Increased permitted export capacity
 - Increased Banks 8,500 cfs pumping window In early Stage 1.
 - Expand Banks permitted capacity to 10,300 cfs by end of Stage 1
- Access groundwater
 - At least 600 TAF in SOD area.
 - Facilities to increase recharge and extraction rates



Conclusions of the DNCT/EWA gaming team

- As a result of the gaming exercise, all members agreed that an Environmental Water Account with a given amount of assured assets will provide long term benefits to fishery resources while providing improvement in water supply reliability and water quality benefits.
- More gaming and evaluation is needed to test other scenarios, with different baselines, mix of assets, and combinations of prescriptive standards.

